

# ACET Junior Academies'

## Scheme of Work for Science

### Big Idea – Living Things

#### Year 5 – Growing up



#### About this unit:

##### PoS – Animals, including humans; Living things and their habitats

This unit begins with looking at humans, and the changes they go through as they age. This builds on 'life cycles' in Y2, where students learnt about generations, and the different stages in human life, as well as basic life cycles of other living things. In Y2, students will have considered what a life cycle is; that it represents how an individual changes, and shows that an adult can reproduce (with another) to form more offspring. In Y5 students will look in more detail at individual life cycles, making comparisons between different groups of living things.

**There is a common theme throughout the Y5 units, which looks at Scientists and how they work.** Each time they study a group of animals in this topic, there is an opportunity to learn about the scientists who found out – and are finding out more – about the facts we are learning. The students should learn not only about the scientists, but about how they carry out this work, and that it involves discovering and implementing ways of protecting living things which are threatened. As with all years, the students should have a 'class year book' where they document features of the school ground, and what they are finding out about it. As they do this, they should consider the importance of habitat to a living thing, and how we can't study any living thing without having an understanding of the habitat in which it is found.

This unit will be reviewed when we study the life cycle of plants later in the year.

There is a PSHE connection – although the unit doesn't involved teaching about reproduction, there are obvious links and the students will have questions.

**Students will learn that lots of changes happen during puberty** as part of the science content.

#### Unit structure

This unit is structured around seven science enquiries:

1. What is your timeline?
2. What changes will happen in the school grounds this year?
3. What happens in a mammalian life cycle?
4. What does gestation mean? and what happens in gestation?

#### Links to previous and future National Curriculum units

Y2 – Life cycles

PSHE

- Y6 – Healthy humans

5. Are insect life cycles all the same?
6. What about amphibians?
7. What are the features of a bird's life cycle?

KS3&4 - Genetics

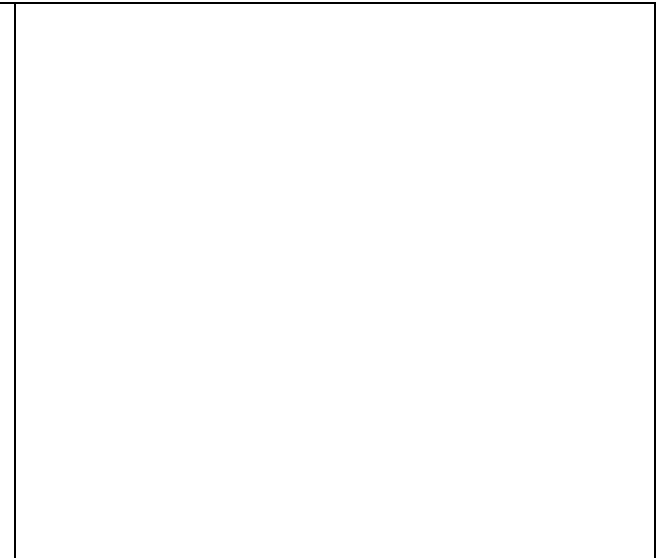
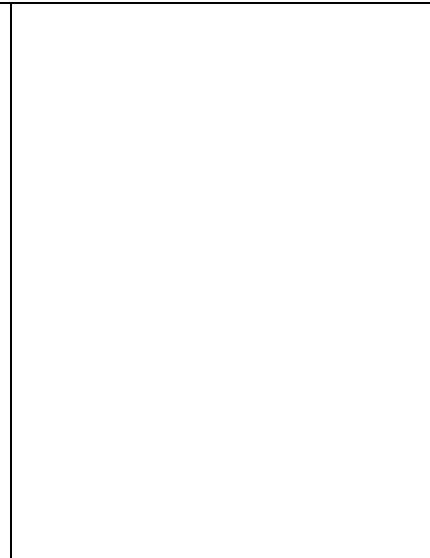
<b>Enquiry 1: What is your timeline?</b>			
<b>Links to previous learning</b>	<b>Scientific skills</b>	<b>Assessment criteria</b>	<b>Curricular links</b>
Y2 – Life cycles	EA – Pattern seeking  Asking questions Making predictions <b>Interpreting &amp; communicating data</b>	<b>Can your children:</b> - State how and when humans change during their lifetime - <b>Interpret</b> information from a growth or height graph	<b>Horizontal:</b> Maths – scale and interpreting graphs  <b>Vertical:</b> Y6 – Healthy humans
<b>Key concepts:</b>			
Humans change significantly during their lifetimes. Most significant changes happen during infancy and adolescence. Plot continuous data on a line graph, and interpret information from it.			
<b>Key terms</b>		<b>Common misconceptions</b>	
Human, baby, infant, child, adolescent, teenager, adult, elderly		<i>Students should know that growth and development is not a linear process. Most changes happen in infancy and adolescence.</i>	
<b>Suggested activities</b>		<b>Resources</b>	<b>Useful links</b>
Human timeline What are the stages of human life? Allow the students to come up with their own ideas – what would you call the different stages? Can you explain why you have chosen those ages?  Draw a timeline – use toilet paper to make equal divisions (see history guidance Y3). Consider which stages of human life take the longest. When do the most changes happen?  Discuss with the students which type of graph to draw to record changes is height/weight. A line graph should be used, because you have continuous data. Most students should begin by drawing one line graph – <i>GD could draw height and weight for comparison.</i>		Toilet paper or similar divided paper  Graph/grid paper  Y5 – data for growth graphs	

Additional activity – maths - Collecting their own data for graphs – students could measure heights of people in the class. They could then discuss the difference between this data and the growth data, and how to record it appropriately.

For these graphs, students should be given the opportunity to make their own scales. However labelled axes should be given to students who cannot make progress. The process of plotting the graph and identifying the pattern is important, and students should not be hampered by the process of drawing scales. ALL students should have the opportunity to interpret information from a graph which is correct.

Students should realise that most significant changes happen in v. early life, and during puberty.

What changes happen? PSHE guidance – what happens in puberty?



Enquiry 2: What changes will happen in the school grounds this year?			
Links to previous learning	Scientific skills	Assessment criteria	Curricular links
Y2 - Life cycles	EA – Observation over time (abstract – identifying features to observe)	<b>Can your children:</b> <ul style="list-style-type: none"> <li>- Identify key features of living things and habitats</li> <li>- Predict how living things and habitats may change – with reasons</li> </ul>	<b>Horizontal:</b>  <b>Vertical:</b> Y6 - Classification
	Asking questions <b>Making predictions</b> Observing and measuring		
	<b>Key concepts:</b> When we want to collect data for comparison later in the year, we have to decide which key features to look at. When we are comparing things over time, we need to make predictions, so we know what to look for.		
Key terms		Common misconceptions	
Habitat, plants, animals, invertebrates, grow, reproduce, more, less			
Suggested activities		Resources	Useful links
<p>We are going to study the life cycles of living things throughout the year.</p> <p>Go outside and choose 3 plants, 2 animals. Students should be given the opportunity to explore, find animals etc themselves, then have a class discussion to choose which you are going to study together.</p> <p>Photograph your chosen organisms and collect as many facts about them as you can. Measure height, width, mass if possible. Measure the circumference of trees and plants with stems. Can you count leaves? Estimate the number of leaves? You want as many facts as possible, so that you can compare them during the year.</p> <p>Identify them if possible – but you may need more clues – like flowers etc later in the year.</p> <p>Can you tell what stage of their life your chosen plants and animals are at? What changes will happen during the next year? Do you think they will reproduce during the next year? How do you think they will do that?</p> <p>Emphasise the importance of making predictions, so that we know what to look out for later in the year. <b>It will not matter if we're wrong!!</b> – if a scientist</p>		Go outside  Identification keys Hand lenses Measuring equipment – 30cm rulers, scales, measuring tapes	

doesn't find what they expect, that's when they start investigating to find out why.



Enquiry 3: What happens in a mammalian life cycle?			
Links to previous learning	Scientific skills	Assessment criteria	Curricular links
Y2 - Life cycles	EA – Research	<b>Can your children:</b> <ul style="list-style-type: none"> <li>- State a similarity and a difference between human life cycles and another mammal</li> <li>- Describe a way in which Jane Goodall discovered more about chimpanzees</li> </ul>	<b>Horizontal:</b>  <b>Vertical:</b> Y6 – Healthy humans
	<b>Asking questions</b> Making observations		
	<b>Key concepts:</b> Mammals all give birth to live young, but some need more care than others before they can leave their parents. Scientists find out the facts we learn about animals by studying them closely over a long time.		
Key terms		Common misconceptions	
Mammal, animal, human, reproduce, breed, migrate, life, care		You may need to remind students that humans, like all mammals, are animals.	
Suggested activities		Resources	Useful links
<p>Show how humans have a life cycle – find an image and discuss the ‘cycle’ part of ‘life cycle’. This is true of all living things.</p> <p>Other mammals have the same life cycles – find images of different mammal life cycles, and compare them to humans – look at the stages of life for different mammals – how long they stay with their parents for, whether they breed for life, whether they migrate to breed, how long their lives are. <i>We will be looking at differences in gestation periods next lesson.</i></p> <p>How do we know this information about animals? Scientists spend years looking at every aspect of the animal’s life. Investigate Jane Goodall and her work with chimpanzees. A lot of what we know about chimpanzees is because of her work.</p>		<b>Human life cycle</b>	<a href="https://www.janegoodall.org/">https://www.janegoodall.org/</a>  <a href="https://www.ducksters.com/biography/scientists/jane_goodall.php">https://www.ducksters.com/biography/scientists/jane_goodall.php</a>

Enquiry 4: What does gestation mean? - and what happens in gestation?			
Links to previous learning	Scientific skills	Assessment criteria	Curricular links
Y2 - Life cycles	<p>EA – Pattern seeking</p> <p>Asking questions Making predictions</p> <p><b>Recording data</b> Interpreting &amp; communicating data</p> <p><b>Key concepts:</b> Different mammals have different gestation periods. Larger animals usually have longer gestation periods. <i>GD – make links with the previous lesson. Is length of gestation related to the amount of care a newborn needs?</i></p>	<p><b>Can your children:</b></p> <ul style="list-style-type: none"> <li>- Relate the length of a mammal's gestation to the amount of care the offspring need</li> <li>- <b>Interpret</b> information from a graph showing different gestation periods</li> </ul>	<p><b>Horizontal:</b> Maths – solve problems converting between units of time Bar charts</p> <p><b>Vertical:</b> Y6 – Healthy humans</p>
Key terms		Common misconceptions	
Mammal, animal, gestation, develop, internal, care, days, weeks, months, newborn, marsupials		'Gestation' refers to the development of offspring inside a parent (usually mammals). Bird, fish, reptile and amphibian eggs have similar periods of development, called incubation.	
Suggested activities		Resources	Useful links
<p>Mammal offspring develop inside the female's body. All other animals lay eggs. How long does it take for a baby to develop? Look at some of the developments of human babies during gestation.</p> <p>Draw a bar chart comparing gestation period with type of mammal. Can the students see a pattern?</p> <p>Students can convert days into weeks – maths skills. <i>GD – can they correlate the length of gestation with how much care the offspring receives? Note that humans don't fit the pattern, as we have to develop more brain than other mammals during gestation, and learn more social skills afterwards. Usually, longer gestation means that the offspring can do more at birth – you could look at videos of newborn giraffes getting</i></p>			<p><a href="https://www.nhs.uk/conditions/pregnancy-and-baby/pregnancy-week-by-week/">https://www.nhs.uk/conditions/pregnancy-and-baby/pregnancy-week-by-week/</a> How babies change during gestation</p> <p><a href="https://en.wikipedia.org/wiki/List_of_mammalian_gestation_durations">https://en.wikipedia.org/wiki/List_of_mammalian_gestation_durations</a> Mammalian Gestation periods</p>

<p>up and running with their herd within minutes, whereas baby mice are helpless and remain in the nest for a considerable time.</p> <p>You could look at marsupials, which are mammals and give birth to live young after a very short gestation period – but the young receive care in the pouch. Discuss advantages and disadvantages of this.</p>		
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<b>Enquiry 5: Are insect life cycles all the same?</b>			
<b>Links to previous learning</b>	<b>Scientific skills</b>	<b>Assessment criteria</b>	<b>Curricular links</b>
Y2 – Life cycles	EA –Research  Asking questions Making predictions <b>Interpreting &amp; communicating data</b> <b>Key concepts:</b> Insects don't all have the same life cycle. Some have complete metamorphosis, others shed their skin and grow bigger. Describe the difference between complete metamorphosis and development as nymphs.	<b>Can your children:</b> <ul style="list-style-type: none"> <li>- Describe development of some insects from eggs via nymphs.</li> <li>- Describe complete metamorphosis of some insects</li> </ul>	<b>Horizontal:</b>  <b>Vertical:</b> Y6 - Classification
<b>Key terms</b>		<b>Common misconceptions</b>	
Insect, invertebrate, exoskeleton, egg, nymph, larvae, complete metamorphosis		<i>Students often think that it is only caterpillars that undergo complete metamorphosis.</i> <i>They should remember that insects lay eggs, and that the offspring develop from them.</i>	
<b>Suggested activities</b>		<b>Resources</b>	<b>Useful links</b>
Students will need reminding that insects are invertebrates (Y2). This means that they don't have any bones inside their bodies, but they have an <b>exoskeleton</b> . This presents particular problems when they want to grow.  All insects lay eggs. Some insects undergo incomplete metamorphosis – like stick insects. They emerge from the eggs looking like tiny versions of the adults, called nymphs. Others (not just caterpillars!) undergo complete metamorphosis – they emerge from the egg as a larvae (looks like a caterpillar or maggot), then form a pupae, completely break down inside, and emerge as an adult insect with wings. Some flying insects – e.g. dragonflies – lay eggs in water, and their larvae live amongst stones at the bottom of streams before undergoing metamorphosis. <i>Metamorphosis</i> –			<a href="https://www.youtube.com/watch?v=6dPsfDmLABE">https://www.youtube.com/watch?v=6dPsfDmLABE</a>  <a href="https://www.youtube.com/watch?v=Q-38ocCB0ss">https://www.youtube.com/watch?v=Q-38ocCB0ss</a>



*change of shape – Link science to the Greeks, to be studied later in the year. 'Exo' and 'skeleton' are also derived from Greek.*

- Caddis flies, may flies and dragonflies are good examples to look at.
- Link with history – study the life cycle of a flea. Look at the impact of fleas on the Tudors.
- Advantages and disadvantages of both methods. Nymphs have to change their exoskeleton regularly as they grow, which makes them easier to be eaten by predators. Other insects are vulnerable during the pupation stage. Pupils could decide which life cycle they would rather have.
- Grow maggots or caterpillars in the classroom?

Enquiry 6: What about amphibians?			
Links to previous learning	Scientific skills	Assessment criteria	Curricular links
Y2 - Life cycles	EA – Problem solving	<b>Can your children:</b> <ul style="list-style-type: none"> <li>- Draw the life cycle of an amphibian</li> <li>- Describe two things scientists can do to find out more about amphibians</li> </ul>	<b>Horizontal:</b>  <b>Vertical:</b>  KS3&4 - Ecology
	<b>Asking questions</b> Making predictions		
	<b>Key concepts:</b> Amphibians undergo metamorphosis, but it is not complete. Scientists have to investigate animals in their habitats in order to find out facts about them.		
Key terms		Common misconceptions	
Amphibian, vertebrate, moist, water, egg, tadpole, metamorphosis, scientists		<i>Students should remember that amphibians lay eggs, and that tadpoles develop from them.</i>	
Suggested activities		Resources	Useful links
<p>The springwatch clip shows a female amphibian expert. It has a lot of good information about amphibians in general, and the impact of environmental change, and humans on them. <i>It does show 30 dead frogs – appropriate?</i></p> <p>Discuss how frogs undergo metamorphosis, but that it is <b>not</b> complete metamorphosis. What makes it different to the complete metamorphosis in insects?</p> <p>Draw the life cycle of amphibians.</p> <p><i>GD - Frogs and toads in the UK have the same life cycle, but breed in different places. What is the difference in where frogs and toads lay eggs, and why do they lay them in different places?</i></p> <p>How does the scientist investigate the life cycle of amphibians? Where does she go/what does she do? As long as students are aware of the life cycle of amphibians, this lesson could focus more on the work of the scientist, and others like her. This could be done collaboratively – students can discuss what she needs to know, and what she would do to find out. Class</p>		Information showing the different life stages of an amphibian	<a href="https://www.youtube.com/watch?v=oL6HM58s5fo">https://www.youtube.com/watch?v=oL6HM58s5fo</a> Springwatch - amphibians

discussion – possibly generating some general questions which the teacher could help find answers to.

Enquiry 7: What are the features of a bird's life cycle?			
Links to previous learning	Scientific skills	Assessment criteria	Curricular links
Y2 - Life cycles	EA - Research	<b>Can your children:</b> <ul style="list-style-type: none"> <li>- State that birds lay eggs and care for their young</li> <li>- Compare how two different species of birds do this.</li> </ul>	<b>Horizontal:</b> Geography  <b>Vertical:</b> KS3&4 Ecology
	<b>Asking questions</b> Making predictions		
	<b>Key concepts:</b> Birds lay eggs and care for their young. Different birds have different ways of doing this		
Key terms		Common misconceptions	
Birds, vertebrates, eggs, offspring, hatch, chicks, predators		<i>Birds are not the only animals that lay eggs! Although it is a key feature of birds, remember that insects, reptiles, amphibians and fish also lay eggs.</i>	
Suggested activities		Resources	Useful links
<p>Name some local birds (e.g. robins, magpies, crows) – try and get out and see which birds you can find.</p> <p>We'll also consider penguins, ostriches and peregrine falcons.</p> <p>Draw their life cycle. They all lay eggs which hatch into mini versions of the adults. The offspring need to be protected and fed until they can look after themselves. The four examples given do these things differently. Compare how the examples above feed and protect their offspring. How long does hatching take? How long do the chicks need feeding for? Do the parents work as a team? What do the chicks eat?</p> <p>This is an opportunity to show some of the work of David Attenborough.</p> <p>Discuss the fact that he is not just a presenter but a naturalist – someone who studies animals and where/how they live. A lot of what we know about lots of animals – including penguins – is because of studies he, and people like him, have carried out.</p>		Bird identification sheets	<a href="https://www.youtube.com/watch?v=MfstYSUscBc&amp;vI=en-GB">https://www.youtube.com/watch?v=MfstYSUscBc&amp;vI=en-GB</a> Emperor penguins breeding – use this to contrast with more local birds  <a href="https://www.youtube.com/watch?v=eJZjzSQ0kiU">https://www.youtube.com/watch?v=eJZjzSQ0kiU</a> Goldfinch feeding young

Students could also investigate the life cycles of reptiles and fish. They both lay eggs, and do not undergo metamorphosis. Most reptiles and fish don't care for their young – they lay their eggs and leave them (sea turtles – lots of images online). This leads to a lot of predation of the young, and means that reptiles and fish lay enormous numbers of eggs to compensate for the loss.

